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VOYAGE COSTS VIA PANAMA AND OTHER ROUTES

Is it possible to estimate, in any reasonably approximate terms, the facilities which the Panama canal will offer to merchant shipping? This question is one of prime importance both to the traders of the world and to the administrators of the canal: to the former because the canal's influence on commerce must depend upon the facilities which it can offer to the vessels which carry that commerce; and to the latter because the income from the canal must depend upon its power to attract vessels to the new route.

The new waterway will connect two great commercial areas—the Atlantic and the Pacific basins. Goods passing to and fro between the countries bordering these two oceans may be carried by any one of several alternative routes. At present they move chiefly either via Magellan Straits, the Cape of Good Hope, by all-sea carriage, or via the Panama, the Tehuantepec, and the American and Canadian transcontinental railways in land or combined land-and-sea carriage. Only by alternating the routes by which this traffic is carried can the canal have any effect on international trade competition and only by inducing vessels which now use the Magellan, the Cape of Good Hope, or the Suez route, to choose the new waterway instead, can it, as a business enterprise, earn an income.

Obviously, the more definitely the merchant is able to estimate the probable effect of the canal in altering routes and transportation costs, the better position will he be in to judge of its influence in his commercial problems; and the closer the canal administration can figure as to the power of the new waterway to attract vessels, the greater will be its ability to determine the proper toll rates to be charged and the total income which it may expect.

Any estimate of the ability of the new canal to attract vessels and thus change trade routes must, clearly, rest upon the relative profitableness to the shipowner of using that route instead of some other; and any attempt to form a judgment on the subject must involve an analysis of the elements which enter into a shipowner's calculations in determining whether he shall send his vessel by this, that, or the other route.

The factors which influence the choice of routes by steamships are appallingly complex. They include such heterogeneous items as distance, ocean currents and winds, weather conditions, dangers of navigation, distances between fuel stations, costs of fuel, way-

freight markets, passenger traffic, toll charges, subsidies, mail contracts, etc. Any attempt to make a general statement in regard to the merits of a particular route, which shall include an estimate of all of these items, must result in confusion and would not be likely to lead to useful results. But among this multitude of factors several stand out preëminently. They are distance (or time), fuel costs, toll charges, way-freight and passenger possibilities, mail contracts, and subsidies. The cost of operating the average freight steamer of 3,000 net registered tons and ten knots speed is about \$300 a day,¹ and the saving of a few days' distance by choosing one route rather than another is therefore a prime consideration in connection with the shipowner's expense account. The costs of fuel at the various coaling stations of the world differ greatly, ranging from about \$3 a ton at New York to about \$10 at Montevideo. An excess of even \$2 a ton in the average cost of fuel at stations along one route, compared with some other route, would make a difference, for a vessel burning 30 tons a day, of \$14,000 or \$15,000 in the annual expense account. Toll charges are, possibly, an even more important factor than either of those just mentioned. Vessels engaged in traffic between the Atlantic and Pacific will if they use either the Suez or the Panama canal be confronted with an outlay of \$1.20 per net registered ton,² or \$3,600 on the average freighter of 3,000 tons for each passage of the canal. The cost of operation of the average freight steamer of 3,000 net tons being approximately ten cents per day per ton, it is obvious that in choosing between either canal route and some other route, it would require a saving of time for such a vessel, other things being equal, of at least 12 days to offset the toll.

For many vessels the receipts from local freights and from through or local passengers are also of vital importance in determining choice of route, and the amount of such receipts will bear some more or less definite relation to the number of way ports and the population and commercial activity of the countries in which these ports are situated. Of two alternative routes, that one which has the greatest number of stations, with the larger population, and the greatest general commercial activity, must offer the greatest opportunities for local business. Yet the rates and profits on such service vary so greatly, and the relative income from such sources compared with other receipts is so inde-

¹ E. R. Johnson, *Panama Traffic and Tolls* (Washington, 1913), pp. 176-179.

² \$1.20 a ton at Panama, and 6.25 francs at Suez, with some slight difference in method of measuring tonnage.

terminate, that it probably would be impossible to form any but the vaguest opinion, in advance of actual experience, as to the relative merits in this respect of two competing routes.

Subsidy and mail contract receipts are also an indeterminate factor. It would, of course, be possible to compute the incomes from such sources as they stand at present, but the figures for today would be of little value tomorrow in estimating their influence on the choice of routes, for they might be changed arbitrarily at any moment by governmental action.

The other factors which enter into the determination of the choice of route are of very minor importance compared with those which have been mentioned. Insurance rates are not likely to be very different on the various alternative routes. The prevalence of storms, unless it be very marked in some particular locality, does not play a great part in altering the routes of steamships. It may cause them on a single voyage to alter their courses somewhat, creating some delay and thus lengthening that voyage; yet, on the whole, in the course of a year, the addition to the expense account is obviously very slight. It would determine choice of route only if all other things were quite equal and competition were very close. The same may be said in regard to differences in port charges. At terminal points, charges would of course be identical by either of two alternative routes. Only at way ports at which a vessel might stop to discharge or receive passengers or cargo would differences between the two routes make themselves felt and then they would only form one of the elements in the expenses of way-freight and passenger business. Only in those cases where this local business furnished a large part of the income of a shipping company would the question be likely to become one of much concern.

The six chief factors, mentioned above, which determine the choice of routes by steamers—distance, fuel costs, toll charges, way-freight and passenger possibilities, mail contracts, and subsidies—apply with varying degrees of force to different classes of vessels. For line vessels, plying on definite routes on a more or less fixed schedule, with sailing dates published many months in advance, all six of the above factors are likely to be important, for, because of their fixed schedule and route and usually greater speed, they are the ones most likely to receive a considerable share of their income from mail contracts, subsidies, and passenger receipts, and to be most interested in procuring way freights to fill space which may not have been taken at the time of departure from the terminal port. The “tramp,” on the other hand, sailing

when, and to the port for which, it can get cargo, and being usually of slower speed, is not likely to carry many passengers or to be considered in the awarding of mail contracts or subsidies, and is much more apt to have full cargo from its port of clearance to its final destination. To the owner of this second class of vessels, therefore, the mere questions of distance, fuel costs, and toll charges are apt to become the dominant ones in his choice of routes.

Just how large a proportion of the world's ocean freights is carried by "tramps" it is impossible to say with any degree of certainty, yet it is a well-known fact that the major part of international commerce is so carried. If, therefore, in examining the relative merits of the various routes, we confine our attention to tramps, we shall get comparisons which will cover a considerable share of ocean commerce, and may arrive at results which, although they may not be conclusive, will at least be suggestive. And we shall eliminate from our problem the confusing and intricate factors of mail, passenger, subsidy, and way-freight receipts, leaving only the other three items to be considered.

The owner and operator of a steamship is of course interested in the ratio of annual receipts to expenditures and will in the long run choose that one of two or more alternative routes which insures him the largest net return. And for the individual owner or for a single ship it would be a relatively easy matter to determine what the choice would be. But the problem before us is a broader one—to determine what the aggregate results of the multitude of individual preferences would be; and in order to do this, it is obviously essential to define the terms of the problem in a form which shall be more or less universally applicable. Individual vessels differ enormously as to size, speed, coal consumption, general running expenses, ratio of net tonnage to cargo-carrying capacity, capital investment, etc., and the best that can be done in attacking a problem like the present is to adopt as the basis of computation averages which may approach as nearly as possible to what may be considered the normal case.

The average size of vessels of the cargo-carrying sort plying between the Atlantic and the Pacific is about 3,000 net registered tons.³ Their cargo capacity is about 6,000 tons; their speed, 10 knots; and their coal consumption, about 30 tons a day.⁴ The average operating expenses, including salaries and wages (both in the land offices and aboard ship), provisions, fuel, maintenance

³ See E. R. Johnson, *Panama Traffic and Tolls*, pp. 176-179; also statistics of entrances and clearances of vessels at various ports.

⁴ Johnson, *l. c.*

and repairs, depreciation, insurance, taxes, a pro rata of the general overhead charges, etc., are in the neighborhood of \$300 a day.⁵ Of this \$300 a day, approximately \$140 is for fuel.⁶ The capital cost of such vessels may be taken at about \$300,000; and the owners expect, with good business, to make an annual profit of approximately 25 per cent.⁷ Allowing for delays in port loading and unloading, loss of time waiting for cargo, time required for inspections and overhauling, etc., such a vessel, when business is good, is at sea under steam probably about 230 days per annum.⁸

Using these average figures as the basis for estimating costs via competing routes it would seem that we might get results which, although they would probably not be applicable to any particular vessel, would at least be comparable with one another and help us form some judgment as to the relative merits of the two routes. Even if there be a large error in the assumed averages the comparisons may nevertheless be valid if the same assumptions are applied in all the cases compared.

The method of calculation used in the following pages can best be illustrated by giving a specific instance. A vessel going from Liverpool to Batavia may choose either the Suez or the Cape of Good Hope route. If it takes the former its expense account will be somewhat as follows:

For the round trip:

| | |
|------------------------------------------------------------------|------------------------|
| 71 days under steam at \$160 a day for general expenses | \$11,360 |
| Tolls at 6.25 francs per net registered ton | \$3,600 each way 7,200 |
| Coal: ⁹ Liverpool—Gibraltar162 tons at 25/3 | \$1,023 |
| Gibraltar—Port Said240 “ “ | 23/0 1,380 |
| Port Said—Colombo429 “ “ | 25/6 2,734 |
| Colombo—Batavia and return 465 “ “ | 26/0 3,022 |
| Colombo—Port Said429 “ “ | 26/0 2,789 |
| Port Said—Gibraltar240 “ “ | 25/6 1,530 |
| Gibraltar—Liverpool162 “ “ | 23/0 932 |

13,410

Cost per round trip.....\$31,970

⁵ E. R. Johnson, *Panama Traffic and Tolls*, pp. 176-179.

⁶ Calculated by assuming a coal consumption of 30 tons a day at a price, \$4.70, computed by averaging the prices in the chief ports on Atlantic-Pacific routes in 1912 as given in Johnson, pp. 159 ff.

⁷ Data obtained by interviews with shipowners.

⁸ Estimate based on sailing schedules of some of the important Atlantic-Pacific lines.

⁹ Taking the 1912 contract prices as given in Johnson, pp. 159 ff., and assuming that the vessel will coal as often as possible in order to save cargo space.

If it chooses, instead, the Cape route, the cost will be:

| | |
|-----------------------------------------------------------|--------------------------|
| 93.4 days under steam at \$160 a day for general expenses | \$14,944 |
| Coal: Liverpool—Durban | 759 tons at 25/3 \$4,791 |
| Durban—Batavia and return | 1,284 “ “ 13/0 4,173 |
| Durban—Liverpool | 759 “ “ 13/0 2,467 |
| | <hr/> 11,431 |
| Cost per round trip..... | \$26,375 |

The annual costs for two exactly similar vessels running, one via Suez, and one via the Cape would be:

| | |
|---------------------------------------------------|-----------|
| <i>Via Suez</i> | |
| 3.2 round trips (230 days) at \$31,970..... | \$102,304 |
| General expenses in port (135 days at \$160)..... | 21,600 |
| Total annual expenses..... | \$123,904 |
| <i>Via the Cape</i> | |
| 2.5 round trips at \$26,375..... | \$65,937 |
| General expenses in port..... | 21,600 |
| Total annual expenses..... | \$87,537 |

This gives us a basis for a rough comparison of the annual expenses of the two vessels; but the annual income must also be considered. On the assumption that the vessels will carry full cargoes, each will take on every voyage all the freight it can put into the space not occupied by the necessary coal. The carrying capacity of each is assumed to be 6,000 tons. Each must surrender enough of this space for use as coal bunkers, to give it a sufficient supply of fuel to carry it over the *longest* distance between stations. On the Suez route the largest amount of space thus sacrificed will be 465 tons (coal from Colombo to Batavia and return); on the Cape route, 1,284 tons (Durban-Batavia and return). The former, therefore, on a round trip can carry 11,070 tons of freight, and in a year \$35,424 tons;¹⁰ the latter, 9,432 tons on a round trip, and 23,580 per annum. Assuming, again, that each would aim at making an annual profit of 25 per cent, and that the capital investment is \$300,000 per vessel, the Suez vessel would find it necessary to get an annual gross income of \$123,904 plus \$75,000 or \$198,904, and in order to do so would be obliged to charge an average freight rate of \$5.62 per ton; the Cape vessel's annual gross income would have to be \$87,537 plus \$75,000 or \$162,537, and its freight rate \$6.89 per ton. Clearly, the Suez route would be given preference.

The freight rates arrived at by the above calculations may be called the "cost of service rates." They focus within themselves

¹⁰ Assuming that it always carries full cargo.

the more important elements of the problem of the choice of routes by vessels of the tramp class: time (distance), fuel costs, general operating expenses, toll charges, income, and normal profits. Therefore, if we make a comparison of the various all-sea routes from the Atlantic to the Pacific based upon figures reached by this method, we shall be likely to get results which will be suggestive.

In making the comparisons it will not be necessary to examine every specific route between every Atlantic port and every Pacific port between which trade is being or may be carried on: certain ports on each ocean may be taken as typical. The bulk of the trade between the United States and the Pacific countries originates or has its destination in our Atlantic states, and New York is by far the chief port of clearance and entry. If we examine the relation of this one city to the canal traffic we shall get results which will be applicable within a reasonable limit of error to all American trade. Similarly, at least 90 per cent of European trade with the Pacific clears or enters half a dozen ports in England and northwestern Europe, such as Liverpool, Havre, Rotterdam, Bremen, and Hamburg. The geographical relation of all of them to the canal is so nearly the same that if we examine conditions for any one of them we shall get a fairly correct picture for all. In the calculations the results of which are about to be presented, New York has, therefore, been chosen as the typical American, and Liverpool as the typical European, port.

In the vast area of the Pacific a much larger number of ports must be considered if we would get even approximately correct results. The best that can be done by way of simplification is to select from among the scores of places with which commercial dealings are carried on some eighteen or twenty which may be regarded as representing regions which differ distinctly from one another so far as their geographical position relatively to the canal is concerned. In making the calculations the following have been selected: for Southern Chile, Coronel; Central Chile, Valparaiso; Northern Chile, Iquique; Peru, Callao; Ecuador, Guayaquil; Central America, San Jose de Guatemala; Western Mexico, Acapulco; Pacific coast of the United States and British Columbia, San Diego, San Francisco, and Seattle; Japan, Yokohama; Northern China, Shanghai; Southern China, Hong-Kong; Philippine Islands, Manila; Straits Settlements, Singapore; East Indies, Batavia; Southern Australia, Melbourne; Eastern Australia, Sydney; and New Zealand, Wellington.

It would not, of course, be desirable to present, here, the voluminous details of the calculations of relative costs and income, by various alternative routes, from New York and Liverpool to all of these nineteen Pacific ports: only the results can be given. They are shown in the following table:

*"Cost of service" rates from New York and from Liverpool to chief Pacific ports by various alternative routes 10 knot,
3000-ton, steamers*

| | FROM NEW YORK | | | | | FROM LIVERPOOL | | | | |
|---------------|----------------------|-------------|-------------|---------------------------------|---------------------------------|----------------------|-------------|-------------|---------------------------------|---------------------------------|
| | Via Magel- lan | Via Suez | Via Cape | Via Pana- ma ³ | Via Pana- ma ⁴ | Via Magel- lan | Via Suez | Via Cape | Via Pana- ma ³ | Via Pana- ma ⁴ |
| TO | | | | | | | | | | |
| Coronel . . | \$4.90 | | | \$3.23 | \$2.60 | \$5.54 | | | \$4.93 | \$4.28 |
| Valparaiso . | 5.05 | | | 3.10 | 2.48 | 5.61 | | | 4.82 | 4.17 |
| Iquique . . | 5.56 | | | 2.80 | 2.15 | 6.03 | | | 4.41 | 3.75 |
| Callao . . . | 5.82 | | | 2.40 | 1.77 | 6.42 | | | 4.03 | 3.37 |
| Guayaquil . | 6.24 | | | 2.07 | 1.45 | 6.86 | | | 3.75 | 3.08 |
| San Jose . . | 6.82 | | | 2.12 | 1.51 | 7.47 | | | 3.81 | 3.15 |
| Acapulco . | 7.07 | | | 2.45 | 1.81 | 7.73 | | | 4.09 | 3.42 |
| San Diego . | 7.80 | | | 3.27 | 2.63 | 8.49 | | | 4.96 | 4.30 |
| San Francisco | 8.16 | | | 3.51 | 2.86 | 8.89 | | | 5.20 | 4.55 |
| Seattle . . . | 8.45 | | | 3.90 | 3.26 | 9.21 | | | 5.55 | 4.89 |
| Yokohama . | | \$8.20 | | 6.21 ¹ | 5.53 ¹ | | \$6.94 | | 7.80 ¹ | 7.15 ¹ |
| Yokohama . | | | | 6.20 ² | 5.51 ² | | | | | |
| Shanghai . . | | 7.61 | | 6.77 | 6.09 | | 6.48 | | 8.17 | 7.49 |
| Hong-Kong | | 7.09 | | 7.12 | 6.44 | | 6.06 | | 8.59 | 7.72 |
| Manila . . . | | 7.09 | | 7.09 | 6.41 | | 6.06 | | 8.52 | 7.92 |
| Singapore . | | 6.34 | | 8.00 | 7.31 | | 5.26 | | 9.43 | 8.75 |
| Batavia . . . | | 6.54 | | 8.34 | 7.65 | | 5.62 | | 9.84 | 9.15 |
| Melbourne . | | 8.32 | \$7.27 | 6.45 | 5.74 | | 7.22 | \$6.83 | 8.12 | 7.40 |
| Sydney . . . | | 8.50 | 7.32 | 6.33 | 5.61 | | 7.46 | 7.14 | 8.00 | 7.27 |
| Wellington | | 8.90 | 7.73 | 5.78 | 5.07 | | 8.07 | 7.53 | 7.35 | 6.67 |

Assuming that in every case that route will be chosen which gives the lowest "cost of service" rate calculated in the manner indicated, the Panama route will be used (if the toll rates remain

¹ Via San Francisco. ² Via San Francisco and Seattle. ³ With tolls of \$1.20 per net registered ton. ⁴ With no tolls.

as fixed at present at \$1.20 per net registered ton at Panama and 6.25 frs. at Suez) from Liverpool; to Coronel, Valparaiso, Iquique, Callao, Guayaquil, San Jose de Guatemala, Acapulco, San Diego, San Francisco, Seattle, and Wellington; and from New York to all of the above and also to Yokohama, Shanghai, Melbourne, and Sydney. The Suez route will continue to be used from Liverpool to Yokohama, Shanghai, Hong-Kong, Manila, Singapore, and Batavia; and from New York to Hong-Kong, Singapore, and Batavia. Manila will be equally accessible from New York by either route. The Magellan route will be abandoned and the Cape of Good Hope route will be used only by vessels plying between Liverpool and Australia.

The "cost of service" freight rates arrived at by the calculations and here presented have, of course, no validity as indicating what the actual rates will be. In the first place, errors in the assumptions upon which the figures are based would vitiate the results; and in the second place, even if the figures were accurate, there would be little likelihood that actual freight rates would be determined, except in cases of full and free competition, by cost of service. Line vessels are almost exclusively in the ownership of members of one or more shipping "conferences" and the rates are rather generally fixed upon the monopolistic principle of what the traffic will bear. In the tramp service, it is true, competition is much more active—often very active—and there is a much stronger tendency for rates to sink to cost of service, yet even here it would be far from safe to assume that freights will fall to that point. The figures, therefore, can safely be used only for purposes of comparison. It is not at all probable, for example, that the freight rate from New York to Coronel via Panama will be the \$3.23 per ton, as shown in the table, or \$4.93 from Liverpool, yet it may nevertheless be reasonable to expect that Liverpool rates, even under only partial competition, will tend to be higher than New York rates in something like the proportion of 4.93 to 3.23, *i.e.*, 52 per cent higher.

If we reduce all the differences shown in the table, to percentages, and represent the results diagrammatically, we get the graph as seen on the next page.

If the method of comparison adopted has any validity, certain interesting and important conclusions may be drawn from these figures. By present routes New York has a slight advantage over Liverpool, varying from 13 per cent in the case of Coronel to

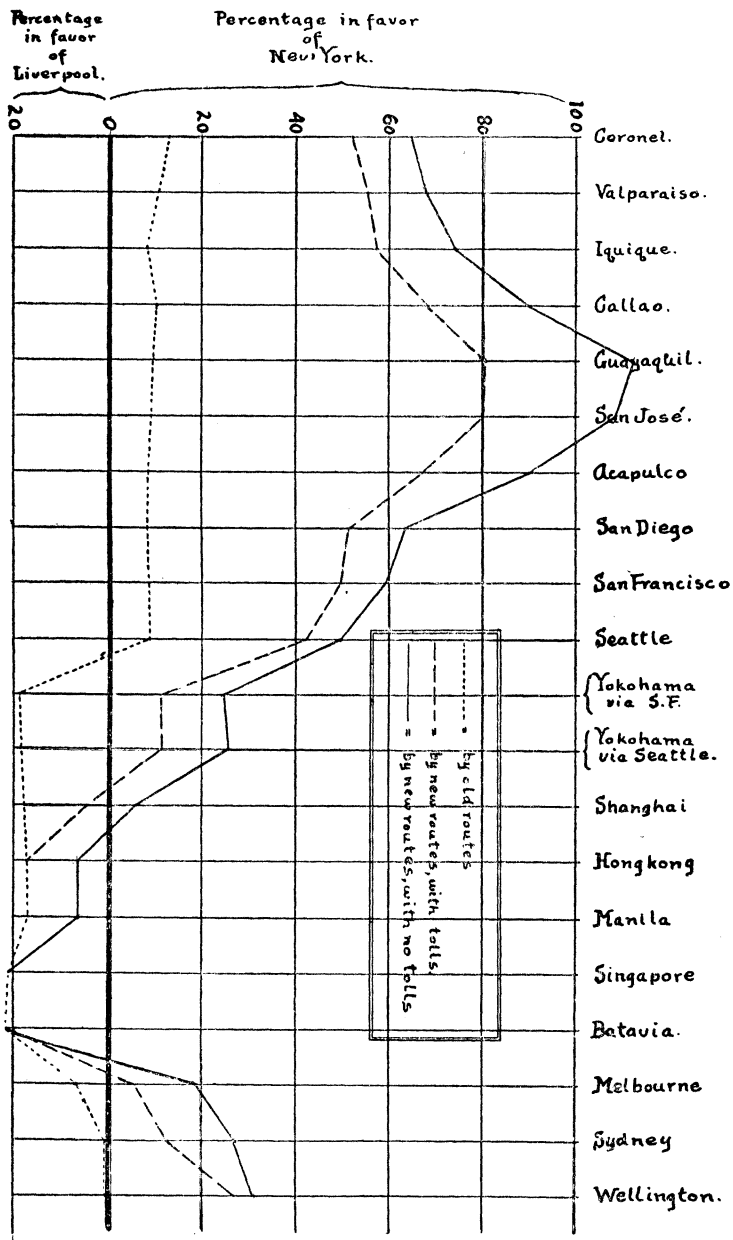


Chart showing percentages of difference in favor of or against New York.

9½ per cent in the case of Seattle, for all ports on the west coast of North and South America. For all other parts of the Pacific, New York is at a disadvantage relatively to Liverpool, ranging from a fraction of 1 per cent for Sydney and Wellington, to 21 per cent for Batavia. When the Panama route is opened, if tolls are charged as at present fixed by presidential proclamation at \$1.20 per net registered ton (assuming that American coastwise vessels are also subject to tolls), the advantage of New York over Liverpool in trade with the eastern littoral of the Pacific will be enormously increased, and will range from 42 per cent in the case of Seattle to 81 per cent in the case of Guayaquil. On the western shores of the Pacific the new route will also alter the relative positions materially. To Yokohama, New York's disadvantage of 18 per cent will be converted into an advantage of 11½ per cent; to Melbourne, a disadvantage of 6½ per cent into an advantage of 6 per cent; to Sydney the slight present disadvantage, into an advantage of 13 per cent; and to Wellington, 27 per cent. For Shanghai, New York will still remain at a disadvantage, but it will be reduced from 17½ per cent to 4½ per cent. For Hong-Kong, Manila, Singapore, and Batavia, there will be no change in the relative positions of New York and Liverpool. On the whole, then, New York's position in relation to Pacific trade will be greatly strengthened.

The figures are also suggestive in another most interesting way. From time to time during the past few years, in the midst of the multitudinous discussions concerning the canal there have been heard faint echoes of a suggestion that possibly the wisest policy which the United States could pursue would be to throw the canal open to the shipping of the world free from any toll charge whatever. Such suggestions have, however, in the main, been allowed to pass almost unnoticed. In most that has been said or written on the subject of the canal it has been assumed that the government, having expended enormous sums on the undertaking, must, as a matter of course, seek a direct return from the enterprise by exacting tribute from those who should make use of the facilities offered by the new waterway. The United States, so the thought seems to have run, is merely the successor of the private corporations which had planned the great work as a business undertaking from which the stockholders were to be expected to derive a profit; and like them the government, having invested a given amount of its capital in the enterprise, is entitled to ask for a return in the same form as they would have expected.

Yet the position of the government is, of course, very different from that of any private parties who might have carried the work to completion. It is investing money from the national treasury and the party to whom the returns from the enterprise may rightfully be expected to come is the whole people of the country. It may therefore well be that the method of seeking an income from the undertaking which would be economically wise for an ordinary business enterprise might not be the best method for the government to employ in seeking the greatest return for the whole people. The economic return to the nation may be derived in one of two ways; either through the collection of tolls which go into the national treasury in account for the whole people, or through the profits on increased trade in general or reduction in freights, which go more or less indirectly to the producers, consumers, and merchants of the country.

The maximum amount which can be collected in tolls during the first few years of the operation of the canal has been estimated at about \$12,000,000 per annum. The total trade of the Pacific Ocean countries with Europe and the United States reaches a total value of approximately \$2,500,000,000 per annum. The United States holds about 25 per cent of this business, or between \$600,000,000 and \$700,000,000. The profits of our exporters and importers, producers and consumers, derived from this commerce probably reach something like 10 per cent, or from \$60,000,000 to \$70,000,000. The Panama canal, even with tolls, will unquestionably largely increase this trade and consequently our indirect profits; but if the remission of tolls, and the consequent sacrifice of \$12,000,000 toll income, should still further increase our business with Pacific countries, it might easily happen that the resultant indirect profits would more than equal the loss to the national treasury. For the purpose of shedding light, if possible, on this question, separate columns giving the comparative cost-of-service rates without any toll charge at Panama have been added to the table above presented and a third line in the graph illustrates the relative advantages to New York under such an assumption.

Comparing the relative advantage to New York with tolls and without tolls, the figures show the following:

(1) For the west coast of North and South America, the advantage of New York would be greatly increased; for Seattle, from 42 per cent to 50 per cent; for San Francisco, from 48 per

cent to 59 per cent; for Coronel, from 53 per cent to 65 per cent; for Guayaquil, from 81 per cent to 112 per cent, etc.

(2) For Australia and New Zealand, New York's advantage would be increased: in the case of Wellington, for example, from 27 per cent to 31½ per cent; and for Sydney, from 13 per cent to 27 per cent.

(3) For Yokohama, similarly, New York's advantage would be raised from 11½ per cent to 25½ per cent.

(4) For the greatest port of China, Shanghai, New York's disadvantage of 4½ per cent would be converted into an advantage of 6½ per cent. For Hong-Kong and Manila, New York's disadvantage would be greatly reduced.

(5) For Singapore and Batavia, conditions would remain unchanged, New York still being at a disadvantage of over 20 per cent.

It is clear, then, if our method of comparison is approximately correct, that the remission of all tolls at Panama would tend still further to strengthen New York as a competitor for the trade of all Pacific Ocean countries except the East Indies. If, as a result of this added strengthening of New York's position, the increase in trade, due to the remission, were to reach the fairly moderate sum of, say, \$150,000,000, the opening of a toll-free canal might result in economic profit to the nation (assuming that traders' profits are 10 per cent). Such an increase, in a trade which aggregates over \$2,000,000,000 per annum, is at least within the range of possibility.

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